L-830/L-831 ADB Isolation Transformers

User Manual

96A0438

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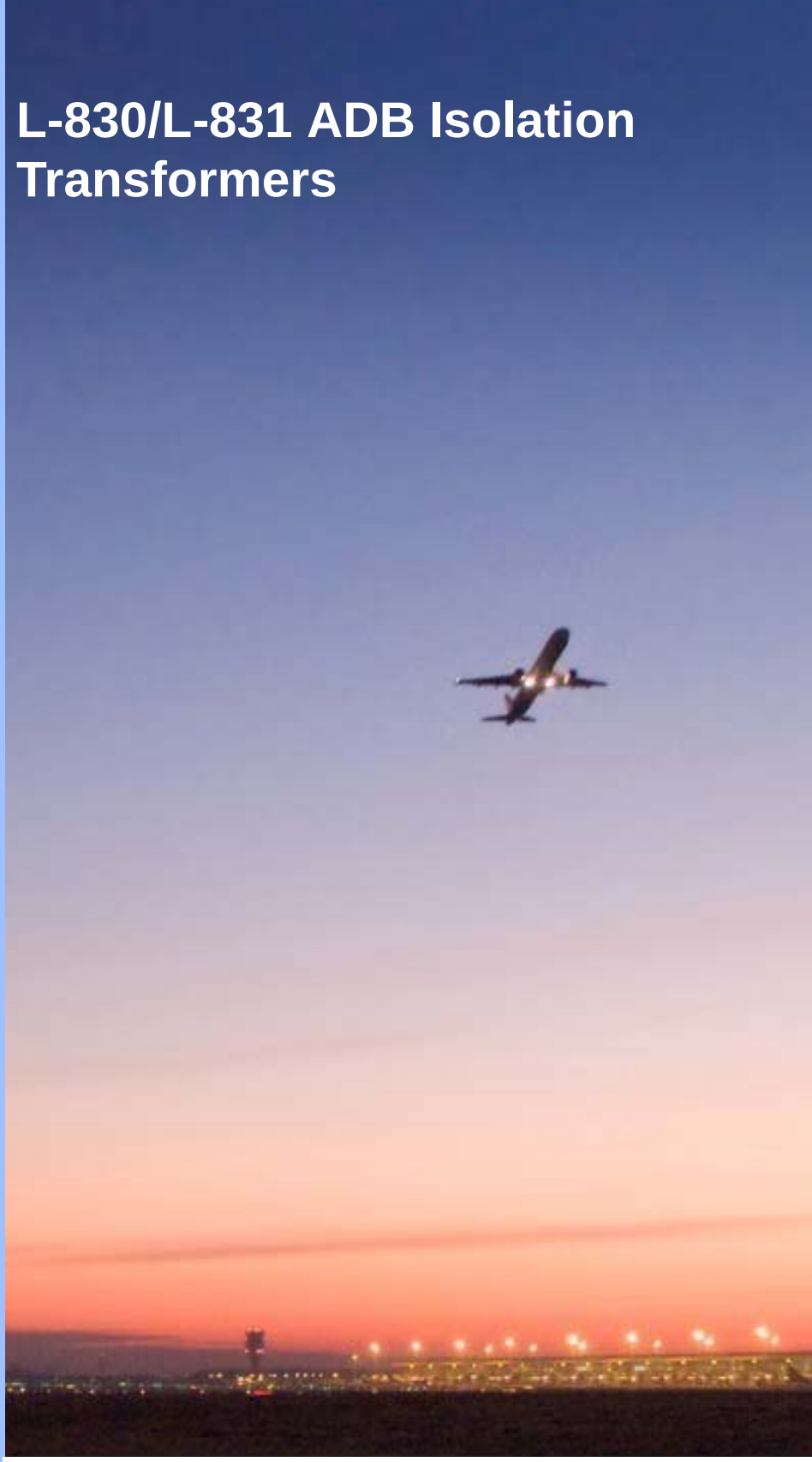
Rev. A, 7/25/12



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1.0 Safety

This section contains general safety instructions for installing and using ADB Airfield Solutions equipment. Some safety instructions may not apply to the equipment in this manual. Task- and equipment-specific warnings are included in other sections of this manual where appropriate.

1.1 To use this equipment safely:

WARNING

Read installation instructions in their entirety before starting installation.

- Refer to the FAA Advisory Circular AC 150/5340-26, Maintenance of Airport Visual Aids Facilities, for instructions on safety precautions.
- Observe all safety regulations. To avoid injuries, always disconnect power before making any wiring connections or touching any parts. Refer to FAA Advisory Circular AC 150/5340-26.
- Become familiar with the general safety instructions in this section of the manual before installing, operating, maintaining or repairing this equipment.
- Read and carefully follow the instructions throughout this manual for performing specific tasks and working with specific equipment.
- Make this manual available to personnel installing, operating, maintaining or repairing this equipment.
- Follow all applicable safety procedures required by your company, industry standards and government or other regulatory agencies.
- Install all electrical connections to local code.
- Use only electrical wire of sufficient gauge and insulation to handle the rated current demand. All wiring must meet local codes.
- Route electrical wiring along a protected path. Make sure they will not be damaged by moving equipment.
- Protect components from damage, wear, and harsh environment conditions.
- Allow ample room for maintenance, panel accessibility, and cover removal.
- Protect components from damage, wear, and harsh environment conditions.
- Allow ample room for maintenance, panel accessibility, and cover removal.
- Protect equipment with safety devices as specified by applicable safety regulations.
- If safety devices must be removed for installation, install them immediately after the work is completed and check them for proper functioning prior to returning power to the circuit.

1.1.1 Additional Reference Materials:

- NFPA 70B, Electrical Equipment Maintenance.
- NFPA 70E, Electrical Safety Requirements for Employee Workplaces.
- ANSI/NFPA 79, Electrical Standards for Metalworking Machine Tools.
- OSHA 29 CFR, Part 1910, Occupational Health and Safety Standards.
- National and local electrical codes and standards.

1.1.2 Qualified Personnel

The term **qualified personnel** is defined here as individuals who thoroughly understand the equipment and its safe operation, maintenance and repair. Qualified personnel are physically capable of performing the required tasks, familiar with all relevant safety rules and regulations and have been trained to safely install, operate, maintain and repair the equipment. It is the responsibility of the company operating this equipment to ensure that its personnel meet these requirements.

Always use required personal protective equipment (PPE) and follow safe electrical work practices.

1.1.3 Intended Use

WARNING

Using this equipment in ways other than described in this manual may result in personal injury, death or property and equipment damage. Use this equipment only as described in this manual.

ADB Airfield Solutions cannot be responsible for injuries or damages resulting from nonstandard, unintended applications of its equipment. This equipment is designed and intended only for the purpose described in this manual. Uses not described in this manual are considered unintended uses and may result in serious personal injury, death or property and equipment damage. Unintended uses may result from taking the following actions:

- Making changes to equipment that are not recommended or described in this manual or using parts that are not genuine ADB Airfield Solutions replacement parts.
- Failing to make sure that auxiliary equipment complies with approval-agency requirements, local codes and all applicable safety standards.
- Using materials or auxiliary equipment that are inappropriate or incompatible with ADB Airfield Solutions equipment.
- Allowing unqualified personnel to perform any task.

1.1.4 Storage

CAUTION

If equipment is to be stored prior to installation, it must be protected from the weather and kept free of condensation and dust.

Failure to follow this instruction can result in injury or equipment damage.

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1.1.4.1 Operation

WARNING

- Only qualified personnel, physically capable of operating the equipment and with no impairments in their judgment or reaction times, should operate this equipment.
- Read all system component manuals before operating this equipment. A thorough understanding of system components and their operation will help you operate the system safely and efficiently.
- Before starting this equipment, check all safety interlocks, fire-detection systems, and protective devices such as panels and covers. Make sure all devices are fully functional. Do not operate the system if these devices are not working properly. Do not deactivate or bypass automatic safety interlocks or locked-out electrical disconnects or pneumatic valves.
- Protect equipment with safety devices as specified by applicable safety regulations.
- If safety devices must be removed for installation, install them immediately after the work is completed and check them for proper functioning.
- Route electrical wiring along a protected path. Make sure they will not be damaged by moving equipment.
- Never operate equipment with a known malfunction.
- Do not attempt to operate or service electrical equipment if standing water is present.
- Use this equipment only in the environments for which it is rated. Do not operate this equipment in humid, flammable, or explosive environments unless it has been rated for safe operation in these environments.
- Never touch exposed electrical connections on equipment while the power is ON.

1.1.4.2 Material Handling Precautions

CAUTION

This equipment may contain electrostatic sensitive devices.

- Protect from electrostatic discharge.
- Electronic modules and components should be touched only when this is unavoidable e.g. soldering, replacement.
- Before touching any component of the cabinet you should bring your body to the same potential as the cabinet by touching a conductive earthed part of the cabinet.
- Electronic modules or components must not be brought in contact with highly insulating materials such as plastic sheets, synthetic fiber clothing. They must be laid down on conductive surfaces.
- The tip of the soldering iron must be grounded.
- Electronic modules and components must be stored and transported in conductive packing.

1.1.4.3 Action in the Event of a System or Component Malfunction

WARNING

- Do not operate a system that contains malfunctioning components. If a component malfunctions, turn the system OFF immediately.
- Disconnect and lock out electrical power.
- Allow only qualified personnel to make repairs. Repair or replace the malfunctioning component according to instructions provided in its manual.

1.1.4.4 Maintenance and Repair

WARNING

Allow only qualified personnel to perform maintenance, troubleshooting, and repair tasks.

- Only persons who are properly trained and familiar with ADB Airfield Solutions equipment are permitted to service this equipment.
- Disconnect and lock out electrical power.
- Always use safety devices when working on this equipment.
- Follow the recommended maintenance procedures in the product manuals.
- Do not service or adjust any equipment unless another person trained in first aid and CPR is present.
- Connect all disconnected equipment ground cables and wires after servicing equipment. Ground all conductive equipment.
- Use only approved ADB Airfield Solutions replacement parts. Using unapproved parts or making unapproved modifications to equipment may void agency approvals and create safety hazards.
- Check interlock systems periodically to ensure their effectiveness.
- Do not attempt to service electrical equipment if standing water is present. Use caution when servicing electrical equipment in a high-humidity environment.
- Use tools with insulated handles when working with electrical equipment.

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2.0 Isolation Transformers for Airfield Lighting Systems

This manual covers all information pertaining to the ADB Airfield Isolation Transformers.

2.1 About this manual

The manual shows the information necessary to:

- Install and maintain ADB Isolation Transformers in an airfield application.

2.1.1 How to work with the manual

1. Become familiar with the structure and content.
2. Carry out the actions completely and in the given sequence.

2.1.2 Record of changes

Page	Rev	Description	Checked	Approved	Date
All	A	Released Manual			

2.1.3 Icons used in the manual

For all WARNING symbols see the Safety section.

Carefully read and observe all safety instructions in this manual, which alert you to safety hazards and conditions that may result in personal injury, death or property and equipment damage and are accompanied by the symbol shown below.

WARNING

- Failure to observe a warning may result in personal injury, death or equipment damage.

CAUTION

- Failure to observe a caution may result in equipment damage.

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2.2 Introduction

Compliance with Standards

FAA: L-830 and L-831 AC 150/5345-47 (Current Edition)

ICAO: Aerodrome Design Manual, Part 5 para. 3.2.1.7a

MIL: MIL-T-27535A

2.2.1 Uses

Designed for use in airfield lighting systems to isolate low-voltage lamps from the high operating voltages present on airfield series lighting circuits.

2.2.2 Features

- Quick and easy connection by means of factory-molded L-823 plugs and receptacles.
- Two single-conductor primary cables (8 AWG, 5,000 V) with a molded Style 2 plug on one lead and a molded Style 9 receptacle on the other lead; one two-conductor secondary cable (12 AWG 600 V) with Style 8 two-pin receptacle
- Complete water tightness–Cables are an integral part of the transformer and their sheath is molded in the transformer body
- May be buried directly in the ground, exposed to the sun, immersed in water, and exposed to other weather elements
- The outer molded jacket is acid-, alkali-, and oil-resistant and also resists deicing fluids, ozone, and UV radiation
- Ambient temperature: -67 °F to +149 °F (-55 °C to +65 °C)

2.2.3 Electrical Supply

Operates at 60 Hz (L-830) on series circuits rated up to 5,000 VAC.

NOTE: The primary windings of the transformer are connected in a 6.6 A series circuit supplied by a constant current regulator. The continuity of the series lighting loop is maintained even if one or more lamps supplied by individual isolation transformer secondaries are open-circuited due to lamp failures. In addition, there is a complete separation of the high-voltage primary and low-voltage secondary windings.

Series circuit components and connectors must be installed per the recommendations shown in FAA AC 150/5340-30 (latest revision). There are many installation variables outside the control of ADB that may affect the overall circuit insulation resistance. ADB Airfield Solutions is not responsible for series circuit insulation resistance requirements above the limits defined in FAA AC 150/5340-30 or AC 150/5340-26 (latest revisions).

2.2.4 Packaging

Table 1: Weight

Style	Part No.	Avg. Weight - lb (kg)
L-830-16	1ST010666010	2.6 (1.2)
L-830-17	1ST020666010	2.8 (1.3)
L-830-1	1ST045666010	3.0 (1.4)
L-830-3	1ST065666010	4.8 (2.2)
L-830-4	1ST100666010	5.9 (2.7)
L-830-18	1ST150666010	7.4 (3.4)
L-830-6	1ST200666010	9.5 (4.3)
L-830-10	1ST300666010	11.8 (5.4)
L-830-14	1ST500666010	16.5 (7.5)

2.2.5 Environmental Conditions

ADB Isolation Transformers are constructed for continuous outdoor service at temperatures from -67° F to 149° F (-55° to + 65° C).

ADB Isolation Transformers operate as designed buried in the ground and submerged in water with up to 5,000 Volts potential between the primary windings and ground.

2.2.6 Common Order, Parts Supplied

L830/L831 Isolation Transformer (see ordering codes)

Heat Shrinkable Airfield Lighting Kit (as required)

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2.2.7 Ordering Codes

Ordering Code **1STXXXXXXX10**

Power Range
010 = 10/15 W (L-830-16)
020 = 20/25 W (L-830-17)
045 = 45 W (L-830-1)
065 = 65 W (L-830-3)
100 = 100 W (L-830-4)
150 = 150 W (L-830-18)
200 = 200 W (L-830-6)
300 = 300 W (L-830-10)
500 = 500 W (L-830-14)

Primary Current
6 = 6.6 A

Secondary Current
6 = 6.6 A

Frequency
6 = 60 Hz

Grounding Connection
0 = Without ground

Ordering Code

FAA Style	Rated Watts	Prim. Hz	Sec. Amps	Amps	Part No.
L-830-16	10/15	60	6.6	6.6	1ST010666010
L-830-17	20/25	60	6.6	6.6	1ST020666010
L-830-1	30/45	60	6.6	6.6	1ST045666010
L-830-3	65	60	6.6	6.6	1ST065666010
L-830-4	100	60	6.6	6.6	1ST100666010
L-830-18	150	60	6.6	6.6	1ST150666010
L-830-6	200	60	6.6	6.6	1ST200666010
L-830-10	300	60	6.6	6.6	1ST300666010
L-830-14	500	60	6.6	6.6	1ST500666010

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2.2.8 Electrical Characteristics

ADB Isolation Transformer characteristics are documented in table 2.

Type	Wattage (Watts)	Primary Amperes	Minimum Power Factor	Minimum Efficiency (percent)	Secondary Full Load Amperes	Secondary Short-Circuited Amperes	Load Ohms	Secondary Maximum Open-Circuit Voltage - RMS
L830-1	30/45	6.6	0.95	80	6.53 - 6.67	6.6 - 7.1	1.15	25
L830-2	30/45	20.0	0.95	80	6.53 - 6.67	6.6 - 7.1	1.15	25
L830-3	65	6.6	0.95	80	6.53 - 6.67	6.6 - 7.1	1.60	30
L830-4	100	6.6	0.95	85	6.53 - 6.67	6.6 - 7.1	2.44	70
L830-5	100	20.0	0.95	85	6.53 - 6.67	6.6 - 7.1	2.44	70
L830-6	200	6.6	0.95	90	6.53 - 6.67	6.6 - 7.1	4.82	100
L830-7	200	20.0	0.95	90	6.53 - 6.67	6.6 - 7.1	4.82	100
L830-8	300	6.6	0.95	90	19.8 - 20.2	20.0 - 22.0	0.90	70
L830-9	300	20.0	0.95	90	19.8 - 20.2	20.0 - 22.0	0.90	70
L830-10	300	6.6	0.95	90	6.53 - 6.67	6.6 - 7.1	8.25	135
L830-11	300	20.0	0.95	90	6.53 - 6.67	6.6 - 7.1	8.25	135
L830-12	500	6.6	0.95	90	19.8 - 20.2	20.0 - 22.0	1.35	70
L830-13	500	20.0	0.95	90	19.8 - 20.2	20.0 - 22.0	1.35	70
L830-14	500	6.6	0.95	90	6.53 - 6.67	6.6 - 7.1	12.0	230
L830-15	500	20.0	0.95	90	6.53 - 6.67	6.6 - 7.1	12.0	230
L830-16	10/15	6.6	0.95	70	6.53 - 6.67	6.6 - 7.1	0.34	8.0
L830-17	20/25	6.6	0.95	70	6.53 - 6.67	6.6 - 7.1	0.57	8.0
L830-18	150	6.6	0.95	85	6.53 - 6.67	6.6 - 7.1	3.58	70
L830-19	150	20.0	0.95	85	19.8 - 20.2	20.0 - 22.0	3.58	70

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2.3 Installation

L-830/L-831 ADB airfield isolation transformers installation procedures are covered in this section.

2.3.1 Unpacking

The isolation transformers are shipped ready to install in the airfield series circuit.

WARNING

Read installation instructions in their entirety before starting installation.

- Do not install a damaged isolation transformer in any circuit.
- Do not disconnect an isolation transformer from an operating series circuit! Extreme voltages will result along with a possibility of an arc flash explosion.

Failure to follow this instruction can result in injury or equipment damage.

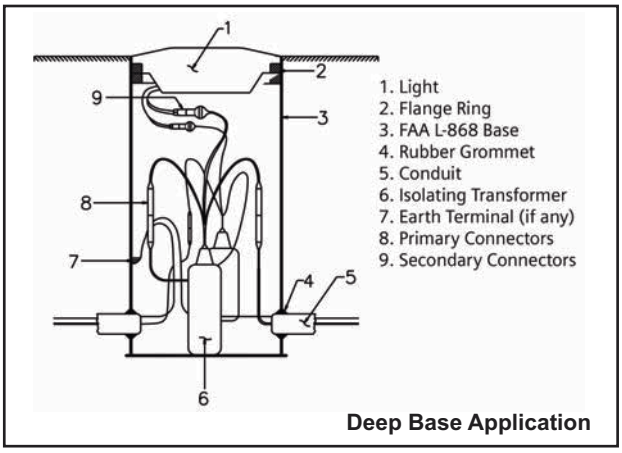
Inspect the isolation transformer prior to installation. Look for cracks and cuts in the cables.

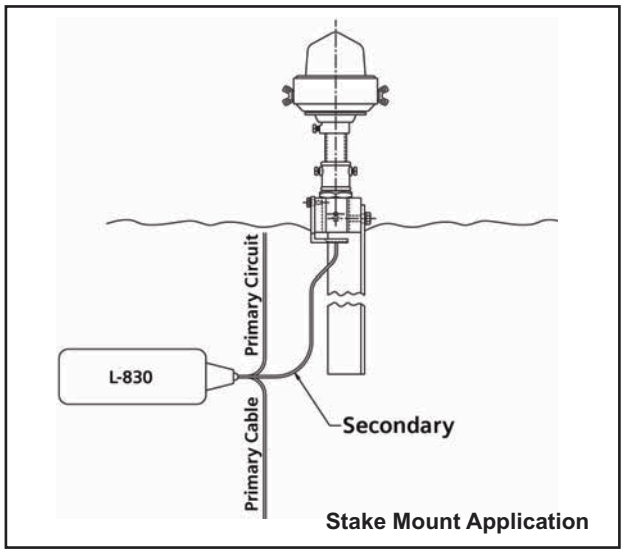
If you note any damage to any equipment, file a claim with the carrier immediately.

The carrier may need to inspect the equipment.

2.3.2 Installation Procedure Options

The following diagrams show the two main option for isolation transformer installation.





2.3.3 Maintenance

ADB Isolation Transformers require no maintenance.

2.3.4 Troubleshooting

To inspect an isolation transformer for possible damage.

1. Tagout/Lockout the circuit using local procedures.
2. Inspect the entire assembly if an isolation transformer fault is suspected.

To test a secondary circuit on a live airfield, USE EXTREME CAUTION.

1. Tagout/Lockout the circuit using local procedures.
2. Place the current testing device around the secondary wire.
3. Energize the circuit and note the secondary current.
4. Tagout/Lockout the circuit using local procedures and remove current testing equipment.

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